CLEMSON

IMPACTS

Farming goes back to the backyard

CLEMSON UNIVERSITY PUBLIC SERVICE & AGRICULTURE - FALL 2014




Farm-City Connection
Protecting honeybees
The outdoor classroom
Watering melons

Vice President's Message

One of the advantages afforded to us by anniversaries and ceremonies – like the centennial of the Smith-Lever Act this year that commemorates the creation of the Cooperative Extension Service – is that they remind us of the people Clemson's public service programs serve – and of the people who deliver their services.

We took a moment recently to honor eight South Carolinians who devoted their lives and careers to improving the state's agricultural economy through Clemson's Extension Service, beginning with Frank Lever, the congressman whose vision created Cooperative Extension in 1914.

You'll find those people on page 14 of this issue: the inaugural class in the newly established Frank Lever County Extension Agent Hall of Fame. The lives of groundbreaking county agents like these are testaments to the adage that public service boils down to people.

Recently several dedicated employees have accepted new responsibilities to enhance the economic impact of South Carolina's agribusiness industries:

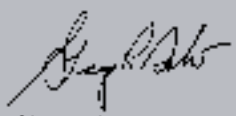
Tom Dobbins has been named director of the Clemson Cooperative Extension Service. A former county agent with a dairy science background, Tom – a Clemson alumnus and long-time faculty member – comes to the job having directed the undergraduate and graduate programs that prepare Clemson students to teach agriculture in high schools across the state.

Chris Ray has been appointed associate director of the Experiment Station, our research arm. A plant scientist who has worked at Clemson for 19 years, Chris has been director of the Agricultural Services Laboratory, head of the Department of Plant Industry and a manager with the Department of Fertilizer and Seed Certification.

Mike Weyman has been named deputy director of Clemson Regulatory Services, a state agency charged with safeguarding the health of South Carolina's crops, forests and landscape plants. Mike, an entomologist by trade, has worked for the Department of Pesticide Regulation since 1998.

These three have new titles and new responsibilities, but they bring the same commitment for which you've known them.

On their behalf – and on behalf of all the Clemson faculty and staff who are devoted to research, Extension and regulatory programs – I express our appreciation for the privilege to serve the people of South Carolina.



Sincerely,
George Askew
Vice President for Public Service and Agriculture

Celebrate the centennial: www.clemson.edu/100

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Back in the Backyard: Farming returns to its roots

By Tom Hallman

You don't have to plow hundreds of acres of beans to be a farmer.

You don't need a vast expanse of pasture, dozens of head of cattle or chicken coops packed with pullets.

The fact is, agriculture began on a small scale as our ancestors learned to cultivate rather than catch their dinner. Farming started in the backyard.

For many, it's now returning there again.

"Many people are looking for ways to be more self-sustaining by cultivating a little crop of their own," said Millie Davenport, a Clemson Extension horticulture agent. "For many it begins as a hobby. For others it's a way to add a little to the family income. Either way, we're seeing more and more people interested in making a little farm in their backyard."

It's for those people that Davenport started the Sustainable Small Farms & Backyard Course, a program designed to teach the basics on how to care for livestock and honeybees or grow fruits and vegetables – not only for the dinner table, but for profit.

Beginning with classes in Clemson and Greenville, the program expanded to include self-paced, online classes to reach gardeners and aspiring farmers statewide. More than 200 people have attended meetings and logged on to learn the basics of beekeeping, the care of chickens, hogs, goats and sheep, and the growth of forage, fruits and vegetables – along with guidelines for selling direct to consumers.

"The consumer trend toward locally grown produce and food products definitely plays a part," Davenport said.

Davenport's experience with backyard farming is both professional and personal. From a few acres on their homestead, her family fills the freezer and pantry from a large vegetable garden, beehives and egg-laying hens.

"For many people it's a labor of love, but it also helps some make a living," she said.

For the majority of farmers in the United States, agriculture is a part-time enterprise, according to U.S. Department of Agriculture statistics. The Sustainable Small Farms & Backyard Course, along with other Clemson efforts such as the South Carolina New and Beginning Farmers program, aim to provide both new and experienced farmers the tools, knowledge and skills necessary to be successful on a small scale.

Those skills begin, above all, with planning, Cory Tanner, a Greenville County Extension agent, told a recent class at the Roper Mountain Science Center in Greenville. His "Small Fruits 101" segment of the Backyard Course took students through gardens to learn how to assess a plot of land and match it to the crop they want to produce. A soil test, he said, is a must.

"Prepare the soil a year in advance if you can. The sooner you prepare the soil, the faster the plants will get their start," Tanner advised. "Select plants that are adapted to your climate, have few pests and diseases, and that have a high market value."

Some of the most successful, he said, are tried-and-true natives of South Carolina. Case in point: muscadines.

"They are very vigorous. I compare them to kudzu in vine growth. That may be a little exaggeration, but not much," Tanner said. "There are no serious pests to muscadines, but they must be pruned annually."

Pawpaws, the largest edible fruit native to North America, also thrives in South Carolina. "It grows all the way into southern Canada, usually along shaded woodland understory and along water," he said.

Regardless of what crop an aspiring farmer wants to grow, Davenport said, the key to success is preparation.

"That was the inspiration for the Sustainable Small Farms & Backyard Course," she said. "When you're making a decision on whether to invest the time, energy and money in farming, you want to know what you're getting into."

Learn more about Clemson Extension horticulture programs: www.clemson.edu/extension/horticulture/

Pilot program seeks to address honeybee-pesticide conundrum

By Tom Hallman

Honeybees and pesticides are mortal enemies. They are also among a farmer's very best friends.

Wouldn't it be something if we could help them get along?

A collection of Clemson specialists is experimenting with a way to do just that.

They've established a pilot program for beekeepers and pesticide applicators to compare notes online in an effort to reduce accidental poisoning of honeybees and their hives.

"We're trying to protect the honey bee. That's what this is all about," said Brad Cavin, who leads apiary inspections for the Department of Plant Industry, a Clemson unit that carries out state regulatory functions. "We want to develop a partnership of farmers, beekeepers, pesticide applicators to identify where bee yards are located."

Jennifer Tsuruda

Dozens of beekeepers from across the state have signed up to take part in the voluntary program, said Jennifer Tsuruda, Clemson's Extension and research bee specialist.

"It allows beekeepers to indicate where their bees are and applicators to indicate where they will be making pesticide treatments," Tsuruda said. "By making this information available online, applicators could stop within a certain distance of the bees or beekeepers could move their hives or close their hives to reduce the risk of exposure."

Though pesticides are essential in reducing insect and disease attacks on food crops, chemicals can't distinguish between the bad bugs and the good ones. And honeybees are clearly the good ones – an essential pollinator for up to a third of the produce humans eat.

"Pesticides may not kill bees directly, but can weaken the bee, making it more susceptible to other threats like the Varroa mite," said Tim Drake, state programs manager for the Department of Pesticide Regulation at Clemson. "We haven't had a lot of bee kills in South Carolina that are directly related to pesticides, but we're at the edge of exploration of what's causing these problems with colony decline."

The system is password protected for confidentiality and privacy; beekeepers can log into the system to load geographic data on their hives and see planned pesticide applications nearby without anyone other than pesticide applicators accessing their information or hive locations.

The pilot program will be evaluated to see if it will be effective on a larger scale. At any given time, about 3,000 beekeepers – most of them part-time – manage roughly 25,000 to 30,000 honeybee colonies in South Carolina. Honeybee health – and the number of bees available for pollination – is an ongoing concern as much in South Carolina as it is globally.

Learn more about beekeeping: www.clemson.edu/extension/beekeepers
Learn more about Clemson Regulatory Services: www.clemson.edu/public/regulatory

Equine Infectious Anemia diagnosed in S.C. mule

The first case of Equine Infectious Anemia (EIA) to be found in South Carolina in a decade appeared in an Aiken County mule this summer.

The disease is caused by a virus related to Human Immunodeficiency Virus. The animal was euthanized under the supervision of Clemson Livestock-Poultry Health officials.

"This 16-year-old mule is the first equine of South Carolina origin to be initially found positive for EIA since the 1990s," said Boyd Parr, state veterinarian and director of the agency, which protects animal health through control of endemic, foreign, and emerging diseases.

South Carolina is the only Southeastern state that did not record a new positive EIA horse between 2003-2013, Parr said.

Testing done at the Clemson's Veterinary Diagnostic Center in Columbia and National Veterinary Services Laboratories in Ames, Iowa, confirmed the diagnosis.

The EIA virus weakens the horse's immune system, causing disease the same way HIV does in people. While humans are not at risk for infection with EIA, similarities of EIA to HIV show how serious an infection it can be in horses and why "we still are adamant about preventing the spread and attempting to eradicate this disease from the equine population," Parr said.

The affected mule did not show any outward symptoms of its EIA infection.

"Many horses in South Carolina have never been tested for EIA and these horses are our highest-risk group for undetected EIA infection," said Adam Eichelberger, director of Animal Health Programs in the State Veterinarian's Office. "This new diagnosis serves as a wake-up call for us and should remind horse owners of the importance of continuing to test for the disease, even in horses that appear perfectly healthy."

All horses going to a public assembly in South Carolina are required by law to have a negative test for EIA within 12 months. All horses entering from another state are subject to the same requirement. A negative EIA test prior to a change of ownership is highly recommended, say veterinarians and animal health officials.

Learn more about Clemson Livestock-Poultry Health programs: www.clemson.edu/public/lph/

A new generation takes root

By Rebecca Dalhouse

Cow snouts and hayrides may draw kids' attention, but a taste of farm life left a lasting impression on nearly 300 third-graders in Abbeville.

"Our goal is to connect kids with agriculture and where their food comes from and show them that it doesn't just magically appear on the grocery store shelf," said Tom Brant, a Clemson Extension agent and coordinator of the annual Farm-City Day for school children from Abbeville County primary schools.

For many children – even those in rural areas – such events are a first taste of farming.

"Just because they live in a rural county doesn't mean they can't be as removed from the farm as urban kids," Brant said. "Farming is a major economic driver in Abbeville County and we are trying to give them a taste of that."

Students at the September event visited 13 exhibits representing the breadth of local agriculture: crops, livestock, forestry, wildlife, vegetable gardening and beekeeping.

They sunk their hands in potting soil, fed sheep, got nose to nose with a Holstein dairy cow and tasted fresh soybeans. But the highlight of the event – hooves–down – was a hayride along a shady dirt path beyond the barn.

The Abbeville Farm-City event, much like others repeated in many counties across the state, represents a coordinated effort of Extension agents and school teachers to introduce rural students to their agricultural roots.

"We're trying to help the kids learn how deeply agriculture is entwined in their lives and in their history," Brant said. "That's a lesson that's important for all of us."

See video from Farm-City Day in Abbeville: http://bit.ly/CU-farm-city

Learn more about Extension programs in your area:
www.clemson.edu/extension/county

Cowgirls win belt buckle bling in cattle competition

By Rebecca Dalhouse

Bethany Prescott has more than good memories to bring home after the 2014 South Carolina Junior Beef Round-Up. She has a shiny new buckle to add to her collection and, most importantly, bragging rights for a year.

The 20-year old from Gray Court shared the spotlight with 17-year old Caitlin Griffin from Westminster by taking top honors in senior showmanship at the annual event, which is held each August at Clemson's T. Ed Garrison Livestock Arena.

"The skills these youth develop here really help prepare them to be leaders in the beef industry," said Robin Long, who coordinated the event. Participants gain valuable experience and networking as well as opportunities to win a share of more than $6,000 in scholarships and awards.

Griffin and Prescott posed for photographs with proud parents and prize heifers under a bright blue banner, buckles sparkling almost as brightly as their smiles.

Bull Hill Julie, the shiny-coated heifer who helped Prescott bring home the top prize, also collected her reward after the win: a back scratch, a bucket of sweet grain and a nap.

See video from Junior Beef Roundup:
http://bit.ly/CU-cowgirls

Learn more about 4-H and youth programs:
www.clemson.edu/4h

OUTDOOR CLASSROOMS STAND THE TEST OF TIME

By Tom Hallman and Peter Kent

Times change. Classrooms change right along with them.

Chalkboards have given way to whiteboards and smartboards. Pencil sharpeners have been replaced with iPads.

In a hundred years, Clemson Extension Service educators have used all of these and more. But the most important Extension classroom has none of them. That classroom is outdoors – in farmers' fields, in forests, and in the research plots of Clemson's Research and Education Centers, or RECs, across the state.

Field Days allow Clemson researchers and Extension agents to bring farmers and gardeners to these outdoor classrooms for hands-on learning. Since the Smith-Lever Act created the Cooperative Extension Service in 1914, these events have had one thing in common: students hungry for information.

"Nothing beats being able to see the science right in front of you and to talk directly to the researchers who explore it," said Tom Dobbins, Clemson Extension director. "As an educator, it's always best to show people rather than just tell people. That's what field days do."

Farmers flock to research plots from Florence and Charleston to Pendleton and Blackville for the chance to see first-hand the research being conducted by Clemson scientists and to talk face-to-face with the specialists who offer up-to-date recommendations for increasing yields, defeating crop pests and maximizing profits.

Here are some snapshots from this year's crop of field days.

A firsthand look at beef and forage

The adage "you are what you eat" is never more true than with beef cattle. So the Beef and Forage Field Day at Clemson's Edisto REC brings S.C. cattle producers face-to-face with both animal scientists and forage specialists to teach best practices for growing both beef and the grass that feeds it.

John Andrae, a Clemson forage specialist, led farmers through the recommendations for selecting and managing the right grasses for their herds as well as studies on fescue toxicity.

Other forage presentations included an update on the Bermudagrass stem maggot, a pest which has swept across Southeastern pastures and has become "a significant problem in South Carolina," Andrae said.

A preview of the annual Edisto Forage Bull Test Sale also included presentations on advanced fencing systems, and how to capture, manage and capitalize on farmers' cow-calf herd data.

Pee Dee: A show-and-tell of crop research

Hats were optional at Clemson's Pee Dee Farm Field Day in September. An overcast sky and day-before rain kept temperatures mild, a fact appreciated by the more than 160 growers who came to see and hear about research into peanuts, soybeans, cotton, bioenergy crops and sorghum.

Perennially important crops like peanuts and soybeans attracted the most attention. Soybean breeder Ben Fallen summarized work to show that S.C. growers could produce solid yields planted later in the season. Fallen also talked about the importance of genetic diversity: 92 percent of the soybeans grown in the United States rise from 30 varieties, creating a potential bottleneck for developing new traits to deal with disease and drought.

Peanut growers saw the results of work from Shyam Tallury. Tallury and USDA researcher Phil Bauer top-lined their findings on the differences between calcitic and dolomitic limes. Tallury showed peanut varieties he has been studying.

"We are breeding varieties to meet your needs – high yield and disease resistant," Tallury said. "We also are working on satisfying industry standards. People want good-looking peanuts that are shiny when they buy them at the ballpark."

Fallen and Tallury are new hires, part of Clemson's Advanced Plant Technology program, which state legislators have funded to develop new varieties and crops.

"The program is an investment in producing food, fuel and fiber for South Carolina, improving farm revenue and generating new enterprises to create jobs and rural community growth," Dobbins said.

A new crop was added to the program this year – grain sorghum. Stephen Kresovich, who leads Clemson's Advanced Plant Technology program, introduced the sorghum research being conducted at the Pee Dee REC and described the potential the crop has in South Carolina's climates and soils. "There's great opportunity here as the grain sorghum industry moves east," he said. "Our plant breeding research is aimed at producing traits in the crop that will make it even more competitive in our state."

Vegetables take center stage at Coastal REC

The "flame weeder" – a propane-fueled device that makes short work of pesky weeds without chemical herbicides – might have been the provocative attraction. But with 325 acres devoted to vegetable research, Clemson's Coastal REC in Charleston had plenty more to capture farmers' attention in its 2014 field day.

Scientists Brian Ward, Richard Hassell and Anthony Keinath led visitors through research projects in organic vegetable production, grafting technologies and the latest disease problems and management tools.

"These are the new releases you'll see in the grocery stores in the next 10 years," Hassell told nearly a hundred Lowcountry farmers as they sauntered through young grafted watermelons. "We're privileged to have them here now."

Hassell provided recommendations on the best varieties for grafting, which he called "an art as well as a science," while others introduced recommendations for organic cultivation, improved fertilizer applications, and disease and insect control.

The center was established in the 1930s to help improve vegetable farming methods to augment a faltering cotton economy. The Lowcountry is now a significant producer of fresh-market vegetables in the state, helping South Carolina play a leading role in production of such crops as tomatoes and watermelons.

Fruits and vegetables add more than $150 million annually to the Palmetto State economy, according to the National Agricultural Statistics Service.

Tobacco field day focuses on profit

Tobacco may have lost its allure, but hasn't lost its value.

Today, South Carolina farmers grew 14,500 acres – merely 10 percent of the acreage devoted to the crop a century before. But tobacco still is a top crop in profit per acre in the state: It brings in more than $60 million a year.

The Pee Dee REC – centrally located to the 14 Pee Dee counties that produce most of the state's tobacco – is the base of much of Clemson's tobacco research and public service work. Research and education efforts are focused primarily on efficient, cost effective and environmentally sound production, management and curing practices as well as greenhouse production of tobacco transplants.

The July field day this year included a tour of agronomy, plant pathology and entomology research.

"We highlighted advances in curing technologies, insecticides for insect control and new methods to control diseases, especially bacterial wilt," said Pee Dee-based plant pathologist Bruce Fortnum.

Simpson field day examines crops old and new

Nearly 300 farmers gathered in the August sunshine to get the latest updates from research and Extension specialists at the Simpson Experiment Station field day near Pendleton.

Their lesson plan included crops old and new. In the case of grain sorghum, the crop was both.

"It's a tough old crop that has been around for years," said David Gunter, a Clemson Extension feed grain specialist, telling farmers of sorghum's renewed potential in South Carolina. "It's a good crop for the state given our hot and sometimes dry weather."

Clemson geneticist and plant breeder Stephen Kresovich said the state is well positioned to take advantage of trends in American sorghum production.

"The grain sorghum industry is based now in the high plains, but they don't have enough water. The industry is going to move east, so it's a great opportunity here," said Kresovich, who leads the university's Advanced Plant Technology program. "Clemson is trying to take advantage of where the science is going and steer it into the crop. We are building the capabilities to help the plant breeders incorporate the traits they want in crops."

Beyond the fields, a grateful group of horse owners clustered inside the cooling shade of a barn to attend a short course on horse health and nutrition. Equine program leader Kristine Vernon, livestock Extension specialist Cassie Wycoff and Clemson horse barn manager Rebecca Shirley handed out brochures, business cards and one-pagers on forage and feed and how to tell when the horse has packed on a few too many pounds.

The group also learned about "TPR" – temperature, pulse and respiration – and the power of observation.

"I teach our students to give our horses a good look everyday," Shirley said. "Check appetite, cuts and bruises, hooves and shoes. Eye problems need tending right away. Eye injuries go bad fast."

Horses, along with pond management, sheep, bees and and 4-H programs were added to the mix this year for the Simpson station showcase.

"The knowledge that comes from the research projects here is designed to be used directly by producers across South Carolina," said station manager Garland Veasey. "It's not often that farmers in the Upstate have the chance to talk directly with our row crop specialists who are stationed around the state. This is a good chance for one-on-one interaction between farmers and scientists."

Science marches forward in watermelons

The unofficial emblem of summer, the watermelon is also big business in South Carolina, the nation's fifth-largest producer of the crop. Grown commercially on more than 7,000 acres here, S.C. watermelons bring about $40 million a year.

So when Clemson's Edisto REC hosts its annual July field day for farmers of the crop, the latest scientific advances in watermelon production are front and center, including a chance to observe 89 different watermelon varieties for their performance in the field.

"It's an excellent opportunity for farmers to see the particular varieties they might be interested in growing," said Clemson Extension specialist Gilbert Miller. "We included results from variety trials in previous years to give them as broad a look at the potential as possible. It's important that they choose a variety that performs well in their climate and soils."

Indoor education sessions on disease management and cultural practices were followed by tours of research fields. In addition to variety trials, Clemson specialists briefed visitors on research on grafting, biodegradable mulch, and interplanting cotton with watermelons.

Future looks bright for S.C. peanuts

Advice for current crops and a glimpse of research into future advances are part and parcel of the annual Peanut Field Day at Clemson's Edisto REC.

In an attempt to bring the future here faster, Clemson peanut breeder Shyam Tallury plants new hybrids twice a year – a summer crop in South Carolina and a winter one in Puerto Rico – to speed the delivery of future varieties to the hands of Palmetto State farmers.

"When you grow a commercial cultivar, you want to breed for resistance to disease so you don't have to spray as many chemicals on it," Tallury told farmers at the September event. "You seek certain traits you need – high-yield, high-oleic, early maturing types. We look for a balance of these traits to select a variety."

In addition to new plant varieties, farmers got a glimpse of Kendall Kirk's research into precision agriculture tools that, by helping better gauge the optimal depth to dig at harvest, will help them recover peanuts – and profit – they otherwise might miss.

Farmers also received advice on current disease, insect and weed management, growth regulators and nutrient supplements, and comparisons of new and traditional varieties of both Virginia and runner types of peanuts.

Learn more about Clemson's Research and Education Centers: www.clemson.edu/public/rec/

See video from the Simpson field day: http://bit.ly/CU-Simpson

Dirty underwear demonstrates unhealthy soil

By Peter Kent

Bury them in a field for a few weeks and even men's cotton briefs can serve the needs of science.

It's a takeoff on an agronomy soil test that uses cotton swatches to measure carbon consumption by microbes. Microbes living in soil with plenty of carbon, rich in organic matter to turn into energy, don't have to eat the cotton. Bacteria in carbon-poor soil will eat what they can scavenge.

The "soiled underwear test" helped Clemson and North Carolina State University Extension specialists teaching a pasture ecology workshop make their points about the importance of healthy soil and how to build it from the grassroots down.

A cattle producer who understands how the interconnected web of life works can have healthier pastures that will be more resistant to drought and more productive over time.

"There's a lot going on underfoot that we can't see but we need to know about and take care of," said John Andrae, Clemson Extension forage specialist. "Many cattle producers grew up learning about the cow part of the operation and not so much about the rest of the system."

The specialists drove the point home by holding up a pair of tighty-whiteys in tatters. The elastic waist and leg bands were about all that remained.

The demonstration showed the results of bacteria turning cotton into food. At the other end of the display, underwear that had been in carbon-rich soil were dirty but no worse for wear.

Cattle producers in the three-day course were impressed, though no one came forward for a closer look.

Funded by a USDA grant, the specialists from both Carolinas teamed up to teach cattle producers in the Southeast about the care and feeding of the interconnected communities that live in the land.

The cattle producers listened and took notes on topics ranging from the soil's physical and chemical properties to soil microorganisms, such as bacteria and protozoa, and soil macro-organisms like earthworms and nematodes of all kinds. There was also a lot to learn about insects, particularly dung beetles in manure; plant communities, including cool-season and warm-season grasses, legumes and weeds; and about cattle, wildlife and people, who are the managers.

It was a lot to take in, said Dixon Shealy of Newberry. His family runs Black Grove, raising Angus cattle. "I came to learn how to make more powerful soil and pastures," he said.

"We hope a few will use some of the practical recommendations we offered," Andrae said. "Maybe they'll fence off a section of pasture and rebuild it. If it works, we hope they'll show other producers the results."

Learn more about Clemson Extension livestock and forages programs: www.clemson.edu/extension/livestock/

Plant breeders release new crop varieties for food, fiber, fuel

By Peter Kent

Clemson University plant breeders released 21 new crop varieties this year to grow food, fiber and fuel.

"These releases will benefit South Carolina growers and showcase the work of Clemson's Advanced Plant Technology Program," said Chris Ray, crop improvement association director.

The S.C. Crop Improvement Association Review Board approved four Roundup Ready varieties of soybeans, nine sorghum varieties suitable for bioenergy and eight cotton varieties jointly released with the U.S. Department of Agriculture research center in Florence.

Deciding on the best varieties involves looking at characteristics contributing to varietal performance. These include yield potential, disease resistance, planting date, maturity, lodging resistance, drought tolerance, tolerance to nematodes and other agronomic factors.

Rarely is one variety perfect for all production systems, so it is useful to breed and select more than one to take advantage of different traits and characteristics.

In acreage planted, soybean is the No. 1 crop in South Carolina. New varieties, developed by Clemson plant breeder Emerson Shipe, provide more options for farmers.

New cotton varieties from USDA plant breeder Todd Campbell improve fiber quality, which determines cotton value, increasing grower revenues.

The new sorghum varieties are bred for bioenergy. They grow more of the green parts of the plant, which can be converted chemically to make fuel, including ethanol and electricity. The new varieties are being licensed to South American growers, who are world leaders in biofuel production.

The sorghum was developed at the Pee Dee Research and Education Center in Florence by Advanced Plant Technology program leader and plant breeder Stephen Kresovich.

Researchers there blend traditional plant breeding and molecular genetics into a comprehensive approach to improve crop yields and quality.

"Our mission is to cooperate with Clemson University, USDA and other agricultural agencies to develop, test, produce and distribute superior strains and varieties of planting stock," Ray said.

"Improved varieties can mean quicker emergence, better stand establishment and vigorous growth to suppress weed infestations," he said. "What's more, uniform plant development — flowering and maturity — makes it easier to time fungicide or insecticide applications. And it means easier harvest and reduced drying costs."

The eight cotton varieties were joint releases between the USDA Agriculture Research Service, Clemson and Cotton Incorporated.

Learn more about Clemson's Advanced Plant Technology Program: www.clemson.edu/public/apt

Cattle don't grow in streams

By Rebecca Dalhouse

Everyone loves a good swimming hole in the summertime, especially cows. Oconee County black Angus producer Carol Hendrix's bovines love a cool stream as much as anybody, but their favorite place to dip their hooves is also their only water supply.

The wide stream that meanders through the Hendrix farm used to be full of mud and cattle. Now, with advice from Clemson Extension livestock agent Morris Warner, the Hendrix farm designed an alternative water system to keep the heifers supplied with fresh water and their muddy hooves out of the stream.

"We were interested in getting the cattle out of the streams and putting in alternate water sources and allowing the owner to have a better opportunity to manage the pastures and forages on the farm," Warner said. "Forage management translates into better growth rates and that turns into dollars."

Cutting down on diseases like foot rot caused by cows standing in water is one of many advantages of the forage management system Warner helped Hendrix implement.

Not only do they have a reliable clean water source, the intensively managed pasture allows Hendrix to control exactly where her cows are and what kind of forage they are eating. The healthy green pasture rolling out in front of them is all the proof Hendrix needs.

"It's made all the difference," Hendrix said. "They're so much healthier now."

See video from the Hendrix farm:
http://bit.ly/CU-streams

Learn more about Extension livestock and forage programs:
www.clemson.edu/extension/livestock/

Sensors keep roots watered

By Rebecca Dalhouse

Watermelons are a thirsty crop, but it turns out they're not as thirsty as Gilbert Miller first thought.

Four summers ago, the Clemson Extension watermelon specialist started taking core samples to measure just how deep watermelon roots reach into the soil in search of nourishing moisture.

If there are two things watermelon farmers want to conserve, they're water and money. And in the sunbaked fields of sandy soil where watermelons prefer to grow, water is a sometimes rare and expensive commodity.

So Miller started experimenting with drip irrigation at Clemson's Edisto Research and Education Center. He uses sensors to determine when, where and how much water is needed after core samples revealed root systems much shallower than he expected.

"They only reach down about 12 inches," he said. "We were irrigating much deeper than we needed and wasting water."

Drip irrigation uses water by the drop, not by the gallon, and has huge potential in South Carolina.

"Most melon farms are in drought-prone areas and our growers don't have a drop to waste," Miller said, "Sensor-based irrigation uses as little as half or less the amount of water as sprinkler irrigation in our test plots."

"On a per acre basis, growers can save on pumping costs as well as water that they would have washed below the root zone," he added.

South Carolina's appetite for melon shows no sign of letting up, so Miller's method may help growers train their crops to sip, not gulp, and keep the iconic pink and green slices sweetening our summers for seasons to come.

See video from Miller's watermelon research:
http://bit.ly/CU-roots

Learn more about Edisto Research and Education Center:
www.clemson.edu/public/rec/edisto/

Research effort on water supply, use

By Peter Kent

A lot goes into America's multibillion-dollar nursery and floriculture industry.

A lot of water especially.

With droughts and regional water shortages creating competing needs among metropolitan and rural areas, producers of nursery plants need innovative approaches to use water more efficiently.

Clemson scientists are helping meet that need with research into alternative methods to help ensure sufficient water for the "green industry."

"Our work will help producers of nursery and floriculture crops in containers obtain and retain reliable, alternative sources of water to decrease dependence on potable water and enhance their long-term economic viability," said Clemson Extension nursery specialist Sarah White.

White and ecological engineer Dan Hitchcock at Clemson's Baruch Institute of Coastal Ecology and Forest Science in Georgetown have been chosen to lead a multistate, five-year project to design and demonstrate ways to treat and recycle water.

The U.S. Department of Agriculture-sponsored project involves 21 researchers at nine universities.

South Carolina alone is home to more than 200 nurseries and floriculture businesses that raise and sell plants, flowers, seeds and foliage. The S.C. industry in 2009 tallied more than $135 million in sales.

Nationally, the water-dependent nursery and greenhouse industry is the fastest growing segment of U.S. agriculture, according to the USDA's Economic Research Service.

The water that nurtures plants can contain contaminants, such as pesticides, salts and harmful microbes. What's needed are ways to filter the water, making it usable again and environmentally safe; for this reason, water treatment techniques are a key component of the research.

Hitchcock specializes in using plants for water quality improvement. Ecological engineers design and build biological systems, such as treatment wetlands and planted buffers, in which plants take up pollutants through their roots, then store, neutralize or metabolize them.

"It really comes full circle – and makes sense – to use plant materials to treat water for reuse in a plant production operation," Hitchcock said.

Hitchcock's Georgetown partnerships create an opportunity to work with S.C. businesses. Parsons Nursery, a wholesaler in Georgetown that already runs an optimal operation, will allow the researchers to test new water treatment technologies on site. In the Upstate, Head-Lee Nursery, a retailer in Seneca, will work with White.

Learn more about the Baruch Institute of Coastal Ecology and Forest Science: www.clemson.edu/baruch/

Inaugural
County Agent Hall of Fame marks centennial of Extension Service

Marking a century of service, eight South Carolinians entered the inaugural Frank Lever County Extension Agent Hall of Fame at ceremonies at Clemson University in September.

In celebration of the 100th Anniversary of the Cooperative Extension Service, the hall of fame was created to honor the careers of "longtime, front-line county agents" whose work had an important economic impact on the communities they served.

The induction began with U.S. Rep. Frank Lever himself – the co-author of the Smith-Lever Act of 1914 that created the Cooperative Extension Service.

Lever, a Lexington County native and Clemson trustee, envisioned a national program that would take research-based agricultural and food-science knowledge from colleges and universities and put it in the hands of working people.

Members of the Lever family with Tom Dobbins (left), Extension Director and George Askew (back), Vice President of Public Service and Agriculture.

"It was Frank Lever's passion that if we could share the university's information with the people, it would change lives," said Clemson Extension Director Tom Dobbins. "His vision 100 years ago changed the face of America. The road since has been paved by the county agents whose careers were made possible by Frank Lever's vision. They were truly giants in their fields."

In addition to Lever, the members of the inaugural hall of fame are:

Robert W. "Bob" Bailey was known statewide for his early morning farm reports on WIS radio and television that began in the 1940s. The Richland County agent also wrote weekly columns in The State newspaper for farmers and gardeners during nearly four decades of service, from 1937 to 1976. Following his Clemson retirement, Bailey, renowned as a "keeper of the land," served as a commissioner, consultant and area director for the South Carolina Land Resources Commission from 1980 to 1998.

J. E. "Jake" Barker, the first area livestock agent in South Carolina, served Anderson, Pickens, Oconee and Greenville counties in a career spanning 1959 to 1988. From his base in Anderson, Barker was instrumental in building the livestock industry in the Piedmont. He led educational programs in South Carolina and beyond, conducting 23 out-of-state "beef study tours" for local producers to learn firsthand from producers, feedlots and processors in large beef-producing regions. He was praised for keeping growers up to date on the latest methods for profitability in beef and forage production and for significantly increasing the membership and reach of the Anderson County Cattlemen's Association.

Albert F. Busby helped build the Newberry County dairy industry, which remains the state's largest center of dairy production. Beginning his Extension career in Lancaster County in 1950, Busby also worked in Chester County before becoming Newberry's third county agent in 1958, a position he held until 1972. Busby was a driving force behind the creation of the Newberry-Laurens Dairy Herd Improvement Association, which helped provide scientific data on each cow in a dairy herd to improve producers' ability to manage their herds. Busby also built a soil fertility program that encouraged farmers to sample every field on their farms, leading Newberry during his tenure to become one of the state's top counties in dairy, poultry, soybean and forage production.

William C. Clinkscales worked as a county agent in both Marlboro and Berkeley counties and an agricultural education teacher in Hampton County before becoming state leader for the Savannah Valley, district Extension director and ultimately assistant director of state operations for Clemson Extension. But it was his work with farmers and young people as much as his administrative success that stood out. "His most rewarding experiences were seeing the growers' progress after testing the newest techniques," noted the nomination. Also, "He was a master at bringing people together and helping them see the greater good in a total effort. He paved the way for many African American students in the Extension Service and the field of agriculture."

Jesse Howard "J. H." Hopkins joined the Anderson County Extension Service in 1941, helping lead a transformation in local agriculture from row-crop farming to livestock, grain, pasture and lespedeza farming. With Hopkins' leadership, Anderson became one of the top grain and beef producing counties in the state. Once one of the state's smallest dairy producers, Anderson County became the second largest during his tenure. His work with youth led to the establishment of the Anderson 4-H Calf Club and the First National Bank Foundation, which loaned money to 4-H and FFA students to buy calves for heifer projects. His work in education included serving on the Anderson County School District 4 board of trustees from 1945 to 1972, including its chairmanship from 1960 to 1972.

Barrett Lawrimore's career in Charleston County Extension spanned more than three decades, during which he worked closely with the area's tomato farmers and helped create the S.C. Tomato Association to increase sales and improve marketability across the region. In 1981, Larimore brought the first Master Gardener program to South Carolina and the Southeast. Taking the idea beyond a simple "train-the-trainer" class, Lawrimore made Master Gardeners an integral part of the county Extension staff – a model that is now used throughout the state. He also developed a nationally recognized model for urban 4-H planning, developing school enrichment programs that are used across the country.

Dora Dee "Mother" Walker worked as a county agent before the Smith-Lever Act created the national Cooperative Extension Service. Starting in 1911 in Barnwell County, Walker was appointed by the U.S. Department of Agriculture to work with both youth and adults in the County Tomato Club. When Extension was created three years later, she became the state's first "home demonstration agent," a post in which she served until she retired in 1946. Mother Walker's 35-year career saw her travel the state to teach new methods of canning, drying and other approaches to food conservation, and led to the creation of the first Home Demonstration Club for women in the Bethel Community of Sumter County.

Learn more about the Smith-Lever Centennial:
www.clemson.edu/extension/100/

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For more info on
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Mark your calendar for the AgriBiz Expo

Plan to attend the S.C. AgriBiz Expo Jan. 14-15 from 9 a.m.-5 p.m. at the Florence Civic Center.

Clemson Extension agents will deliver educational sessions on farm safety, confined animal manure management, precision agriculture data management, cover crops and soil health, and a mini-conference on small farm management. The College of Agriculture, Forestry and Life Sciences will host Youth Day on Jan. 14.

There also will be exhibits and demonstrations by equipment manufacturers, a mini-conference on agri-tourism by the S.C. Department of Agriculture, a post-expo conference by the S.C. Farm Bureau and opportunities to sample the state's varied agricultural products.

Find more information online at **www.scagribizexpo.com**.